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SUGGESTIONS

ON THE

Prevention of Tuberculosis

AS WE KNOW IT TO-DAY.

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SUGGESTIONS ON THE PREVENTION OF TUBERCULOSIS AS WE KNOW IT TO-DAY.

BY S. WESTRAY BATTLE, M. D., OF ASHEVILLE, N. C., MEMBER OF THE NORTH CAROLINA BOARD OF HEALTH.

MR. CHAIRMAN:—In calling the attention of this Board to the consideration of measures to prevent the spread of the hydra-headed monster, tuberculosis, I wish to preface my remarks by disclaiming any intention of being other than conservative. It is so easy to become an alarmist, and when backed up by bald facts and figures, such as the history of tuberculosis offers, he must be phlegmatic indeed who is not stirred to his inmost soul by the contemplation of the ravages of consumption.

The brief remarks I shall make will simply be intended to open the discussion on the subject now agitating the world. So, then, Mr. Chairman, I want to know what we are going to do about the greatest scourge the human race has ever known? What are we going to do about a disease which annually carries off 7,000,000 people, and, coming closer home, strikes down 150,000 inhabitants of the United States, and, closer still, causes the death of not less than 4,000 people in the State of North Carolina? Think of it, within our sparsely settled borders ten deaths occur *per diem* from this dire malady, and yet we complacently move on, scarcely giving it a thought. It is simply consumption—we are used to that. It is part and parcel of our existence, we say. Still, let yellow fever or cholera threaten our borders, and town, county, State and Federal Government are up in arms and ready to spend any amount of money; yet this epidemic is nothing compared to the great epidemic of tuberculosis, which causes more deaths per annum than all the other contagious and infectious diseases combined. Contemplate 300,000 tons of consumptive bodies to be buried annually—just think of it! And think of the billions and billions of vigorous bacilli tuberculosis which lie under the surface of the earth, whose life-term is anywhere from five to twenty-five years. Bacilli have been found in the earth from cemeteries where inhumation has not been practiced for twenty-five years. Is it strange that consumption is increasing? And is it any wonder that with our present knowledge of the communicability of this disease the attention of every sanitarian is directed towards its suppression, since it is conclusively proven that rather more than one-seventh of the entire mortality of the world is directly traceable to it?

In order that we may the more intelligently devise ways and means for its prevention, let us briefly review the ætiology of tuberculosis and the manner in which it affects the human species.

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Since Dr. Robert Koch, in 1882, announced to the world his discovery of the bacillus tuberculosis, our views in regard to this disease have undergone radical changes. It is now a fairly established fact that this bacillus is a specific pathogenic agent in the production of what we know as consumption. From time to time, as the discovery of the specific germ of other diseases has led us to take measures aimed at its destruction, so in this disease investigation is turning on more and more light upon the nature of this subtle enemy, sooner or later to be vanquished or modified, perhaps, as the small-pox has been.

This special bacillus or germ is a small vegetable parasite, rod-like in shape, having a length of about one-fourth to one-half the diameter of the red blood corpuscle, so that it would require from 7,000 to 15,000 of these tiny vegetable rods, if placed end to end, to measure one inch. The staining of these bacilli, so that they may be readily seen by the microscope, is easily done and a matter of only a few moments' work, and where there is the least doubt in regard to the diagnosis the physician should at once resort to his microscope.

Bacilli are said to be universally present in the lower stratum of the atmosphere, just as they are always found in the upper part of the earth, with the exception that tuberculosis is rarely ever found over ten thousand feet in altitude, and never found over sixteen thousand feet elevation. Scrapings from beds occupied by tubercular patients, the dust on the floors, on the walls, in the curtains, etc., and dwellings previously occupied by phthisical patients all teem with bacilli. Guinea-pigs injected with these germs die rapidly of consumption. Dr. Osler has estimated that from one and one-half to four billions of bacilli are expectorated daily by every well-marked case of phthisis.

It is hardly necessary to say that the bacilli are not alone found in the lungs, but frequently in every glandular structure of the body and in the bones. And we find it, too, in the disease called lupus, which is really nothing more than tuberculosis of the skin. So you perceive that tuberculosis does not always mean tuberculosis of the lungs, but the fact is we do recognize it most usually in the respiratory organs for the simple reason that they furnish the easiest mode of ingress, and there the bacilli are more likely to find a cultivated field in the bronchial glands and submucous tissues.

But a little while ago tuberculosis was considered hereditary. Now all is different. It is said that it cannot be born in an infant, but must be acquired. This is at least a source of comfort, for how cruel indeed would be the death-rate if to its now known communicability should be superadded hereditary consumption. But that an hereditary susceptibility, which is almost as bad as direct transmission of the germ, is the rule, is now a fairly well-established fact. Not all people are susceptible, nor even all the mammalia, though we know a large proportion of the

human species is liable to become affected, and cattle, monkeys and guinea-pigs are most susceptible of the lower animals.

It has become common to speak of a person non-susceptible to a contagious or infectious disease as being immune. The great aim of the present day is to render the human species immune to the bacillus, and on this line Koch, Klebs and others are hard at work. A few years ago the former thought he had pursued the enemy to its lair and forever routed it by the manufacture of a lymph which is now commonly called tuberculine, and, with modifications, tuberculosidine. The world was agog, but was disappointed, for the wary bacillus, hidden in the fastnesses of the lymphatics, eluded its enemy, not always, to be sure, but often enough to make the remedy fall into some sort of disuse and disrepute. Yet the discovery was one of the greatest of the age, and along this line will yet be found, I predict, the remedy to render the human species immune.

What peculiar diathesis, we may ask, or hereditary tendency, is it that opens wide the doors for an entrance of this bacillus? Why some immune and so many not? I will answer that this susceptibility seems to be a condition closely allied to the strumous diathesis, a condition generally hereditary, but may be acquired, so that it is not uncommon for a subject to begin life immune and become susceptible through environment and affections other than tubercular. An untainted heredity is surely the most priceless gift of the Almighty.

By the way of illustration, the human species may be compared to nature's great cultivated field. Struma and its allies are the fertilizers, the bacillus tuberculosis is the seed, consumption the harvest. Let us take, for instance, two subjects, both apparently in vigorous health, but one with a strumous history, for we must not lose sight of the fact that a person with a strumous heredity is not incapable of the maximum of health, the latter is simply susceptible, the first is not. Inoculation of the first with a culture of the bacillis tuberculosis would in all likelihood produce no results. Tuberculosis would surely follow the inoculation of the latter. The first will go through an influenza, an ordinary bronchitis or pneumonia, and soon be as well as ever, whether the bacillus is present or not. The latter readily falls a victim to tuberculosis. As Dr. E. A. Wood has tritely put it: "A strumous person, an open sore, the presence of the bacillus, lymphangitis, bacillary consumption; that is the gamut of fate."

The lymphatic gland is the habitat of the bacillus tuberculosis, and the latter never enters a lymphatic gland without destroying it, but it is rarely, if ever, found in the blood. When found there it seems to be a pretty well-established fact that it is accidental and transitory, that it is on its way to one of the depuratory organs. Indeed, the blood is shown on to be intolerant of the bacillus and the blood corpuscles destructive to its life. When inoculation from the bacillus culture is done, the nearest

lymphatics are soon engaged in a lymphangitis and in the susceptible subject general tuberculosis follows. The bacilli may reach the blood in many ways, but they never linger there. Their reception is unfriendly, and those that escape find their way into the nearest lymphatic vessels, there to do their deadly work, and with their swarming offspring proceed to other glands to kill and destroy. So its choicest pabulum is adenoid tissue, and all the remedial agents that have ever established any merit for themselves have been such as have acted upon this glandular system.

Sterilize the lymphatics and the subject is immune. Perhaps along this line of Pasteurism a guinea-pig, one of the most susceptible of the lower mammals to tubercular infection, may be made immune, and it appears to me as quite in the range of possibility, even probable, that products from its lymph may be used and the human species at last be protected against this now spreading poison.

Every tubercular patient is a menace to the community in which he lives. By far the most common means of spreading the disease is the sputum dried into dust and disseminated by the atmosphere into the lungs of innocent but susceptible persons. But this is not the only means of dissemination. The dairy is a common source of tuberculosis, especially in children, as it is estimated that three per cent. of the dairy cows near our large cities are tubercular.

To sum up the more common ways by which the bacilli enter the human system, we may mention inhalation, the ingestion of bacilli derived from mammals, either as food or drink, by using, or handling infected articles, as money, furniture, etc.

With our present knowledge, no open sore should remain an open sore any longer than possible. More especially should this be observed in the strumous subject.

Let us now briefly consider means for restriction or prevention of tuberculosis. Society must be educated, and surely legal methods are consistent with the highest civilization. We vigorously quarantine against other infectious diseases, as small-pox, yellow fever, cholera, etc.; then, in the name of the commonest of common sense, if tuberculosis is preventable, let the sanitarian overcome the difficulties, if difficulties do exist, and educate the masses, by authority invested in the Board of Health, by literature and every means in his power.

1. In the first place, then, every tubercular patient should be instructed by his medical adviser to see to it, by every means in his power, that others should not suffer through his own affliction, and that his own recovery hinges largely upon the scrupulous care with which he disposes of his own excreta and pathogenic secretions. Let him never expectorate where the sputum will dry. Ingenious paper sanitary cuspidors, cheap and easily procured, may be readily obtained, and these should be daily destroyed by burning. Persons suffering from consumption who spit

on the floor or on the street should be subjected to a fine, if, indeed, such a punishment should not be meted out to him whether he has consumption or not. Some of my patients have found it convenient to carry in the chatelaine bag a small wide-mouthed bottle with rubber stopper, in which is poured every morning a small amount, a spoonful or two, of a solution of bichloride of mercury. Into this one may easily and inconspicuously expectorate, and avoid the use of handkerchief or napkin, which should never be used unless they are destroyed before they become dry.

2. Our State Board of Health should by all means make it obligatory on the part of physicians and householders to report to the local Board of Health all cases of tuberculosis, so that the State Board can properly give instructions to patients and attendants, through their local health officers, of measures relative to the restriction of the disease. Such measures need not interfere with the individual liberty of the sufferer, or in any way hamper him in his usual avocation. The Board is already vested with such authority in regard to other contagious and infectious diseases, and the sooner we add tuberculosis to the list and enforce such regulations the better for the general public. For, as I have already remarked, tuberculosis is contagious, and is so recognized by every progressive medical man. In this connection I may say that it is within the walls of buildings that tubercular infection is almost entirely found, the chance of infection outside being almost reduced to a minimum as compared to the danger within. Intimate household life is responsible for the spread of the disease.

Dr. Flick, of Philadelphia, after studying the distribution of tuberculosis in a single ward of that city, found that about one-third of the houses were infected with pulmonary tuberculosis, and that in thirty-three per cent. of those infected there was more than one case; that is to say, that one-third of all dwellings contained tuberculosis, and of these one-third contained more than one case. Very few physicians of experience can fail to recall households where two or more in the family have died with the disease.

But since it is not hereditary the contagiousness thereof must appeal powerfully to any thinking man. More than a century ago, long before consumption was thought generally to be contagious, a law was enacted in Naples compelling physicians to report all cases of tuberbulosis to the Health Department under a penalty of a fine of three ducats; the second offense was punished by ten years' imprisonment. By the rigid enforcement of such a law, it is claimed that Naples has reduced her mortality from consumption ninety per cent. England and other countries are taking up the matter of isolation of tubercular patients, and are daily reducing their mortality from this disease.

There could really be no greater charity than establishing State Sanitaria in good localities for the segregation and isolation of the consump-

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tive poor, where they could receive proper food and judicious management. Nor would this be poor economy when we consider, aside from the question of sociology, what an enormous saving would result, by the lessened mortality, in the thereby prolonged business activity of thousands of the State's best subjects. Society must by all means be protected, and how better than by the inauguration of such institutions, which we can readily see from the above would not, in the long run, prove a burdensome charity.

3. In the matter of the disposition of those dead of tuberculosis cremation should be the law, rigidly enforced. The body should be wrapped in sheets wrung out of a solution of bichloride of mercury and cremated as soon as possible, for we have seen that live germs are found in cemeteries from two to twenty-five years after burial has taken place.

4. All dwellings and public institutions which have been exposed to infection from patients suffering from tuberculosis should be properly disinfected, and this should be a law. And all beds, carpets, curtains, etc., should be steamed for at least two hours. As a general disinfectant for washing walls, floors and articles of furniture nothing is perhaps better than a solution of bichloride of mercury, one part to a thousand.

5. The State Board of Health should have the power and means with which to cause careful and scientific bacteriological examinations in any case where the condition arouses the suspicion of tubercular infection, as in food products, milk, etc., as furnished in our cities and towns.

In conclusion, I cannot do better than suggest that we adopt the resolutions, relative to restriction of this disease, which were recommended by the Committee on the Restriction and Prevention of Tuberculosis of the American Public Health Association in Chicago, October last. These resolutions, as adopted, read:

1. The notification and registration by health authorities of all cases of tuberculosis which have arrived at the infectious stage.

2. The thorough disinfection of all houses in which tuberculosis has occurred, and the recording of such action in an open record.

3. The establishment of special hospitals for the prevention of tuberculosis.

4. The organization of societies for the prevention of tuberculosis.

5. Government inspection of dairies and slaughter-houses, and the extermination of tuberculosis among dairy cattle.

6. Appropriate legislation against spitting into places where the sputum is liable to infect others; against the sale or donation of objects which have been used by consumptives, unless they have been thoroughly disinfected.

7. Compulsory disinfection of hotel rooms, sleeping-car berths and steamer cabins which have been occupied by consumptives, before other persons are allowed to occupy them.